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HISTORICAL DATA CONCERNING BUILDING LEGISLATION

BY - FRANK BURTON

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Ordinarily we think of building codes as strictly modern development, but a brief study of records of the past will show that this is far from the truth. Histories usually deal with wars, kings and other spectacular events and personages, while the humble builder does his work unnoticed. Such buildings of antiquity as attract universal attention are generally temples, castles or forts, which, from their very nature, are not affected by building ordinances, while the houses of the poorer people are largely ignored.

It is quite clear from such scraps of information as are still preserved, that in all ages and in all countries where important cities were built, the local governing authorities interfered in some degree with the building trades in the interests of public safety and well being. Because of the relatively limited number of persons interested in such matters, these laws, when in foreign languages, have seldom been translated. In many cases the records have been destroyed, and this applies to many modern American cities when the older municipal acts are often no longer in existence.

In a general way one might say that in the beginning, building regulations were the outgrowth of civil rights, which for the better protection of the public were later issued as

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local regulations. The earliest regulations were intended chiefly to prevent the collapsing of buildings which was remarkably frequent in antiquity. Later the resistance of structures to the spread of fire became the object of numerous restrictions, and lastly questions of sanitation were considered. It is only in our own time that there has been any serious attempt to regulate the details of engineering design, but this was due, no doubt, to the ignorance of design which made regulation of this sort difficult to formulate and almost impossible to enforce.

The earliest trace of building regulations which I have been able to find appears to be the royal marks upon the dry mud bricks used in the buildings of Ur, an ancient city of Asia Minor, from which the civilation of Egypt was obtained. Many explanations have been offered as to the reason for these marks, but the interpretation I put upon them was that the king held a monopoly of the manufacture and marked his product for identification. The monopoly was, no doubt, profitable, but was maintained under the guise of a public necessity to protect building owners from poor materials.

Vitruvius, an architect who lived in Rome at the time of Augustus Caesar (about the year One) relates that at "Utica" (a city in Greece) in constructi~~on~~ng walls they used brick only if it is dry and made five years previously, and approved as such by the authority of a magistrate.

The first written regulations regarding building construction appear in the Code of Hammurabi, a king and famous law giver, who ruled Babylon about 2250 B.C. Several sections (Nos. 228 to 233) deal with the obligations of contractors to owners, and provide that if a house collapses and kills the owner the contractor shall be put to death. The maximum price per square foot of building was also established as well as the wage scale for mechanics. The cost of a one-story house, 24 feet by 32 feet, was equal to 426 times the daily wage of a carpenter. At $5 a day, this would equal $2,130.00, or not much less then the cost of a modern house, without a basement.

As to Egypt and Greece, there seems to be little or no information preserved aside from the chance remark quoted from Vitruvious; but in Rome, the law giver of Europe, there is considerable information in existence, but only a very little has been translated into English. In the Roman Republic a number of "urban servitudes" were recognized, such as the right to rest beams on an adjoining neighbor's wall, the right to receive water from his eaves or the right to force him to provide rain-water drains to dispose of the water; also the right to light from over his garden and the right to limit the height or or extent of his buildings, were recognized as servitudes or easements belonging to the adjacent property. Such servitudes could be created by mutual agreement or by ancient usage, and once established, could be dissolved only by mutual agreement. As the city grew larger numerous disputes arose, and it was often impossible to determine the rights of the various parties.

Under the Empire, local regulations gradually replaced the servitudes and the inspection of buildings was placed in the hands of the aediles, who were minor officers of considerable dignity, being custodians of the temples and having charge of th the public games and the maintenance of pavements.

The Lex Julia Municipalis governed many aspects of building construction, but unfortunately the portions devoted to this subject are no longer in existence. The regulations regarding maintenance of pavements are, however, remarkably clear and well written.

Vitruvius mentions that an architect should have a fair knowledge of laws so that "he should know those which are necessary in the case of buildings having party walls, with regard to water dripping from eaves, and also laws about drains, windows, and water supply." A pparently mud-dried bricks were largely used at this time and gave considerable trouble because there were numerous regulations intended to discourage their use, one of them being that no wall adjacent to a street could be more than 18 inches thick. Vitruvius defends the use of such bricks when properly made, but notes that an 18-inch wall will support only one story.

T he reigns of Julius and Augustus Caesar were days of rapid growth in R ome. Speculative builders erected apartment houses of great height and many of them were poorly built, according to Vitruvius. Collapses appear to have been numerous and Augustus enacted a law limiting the height to 70 feet.

Later, under Trojan, this was reduced to 60 feet because of the large number of collapses. Timber-framed walls filled with mud were common at this time and small wooden buildings although prohibited by law, were not uncommon. Under Nero a great many such buildings devoted to the sale of the Roman equivalent of "hot dogs" were constructed about the Circus Maximus, and it was a fire within one of these buildings which destroyed Rome and not an intentional act of Nero's. After the fire a serious effort was made to require the construction of masonry buildings, but no ordinances on this subject appears to have ever been translated.

The sanitary regulations of Rome were more complete and more thoroughly enforced than the building regulations, and without these it is quite certain that it would have been impossible to house so large a population in so limited an area. In the later days of the Empire, civil authority fell into decay, and both sanitary and building regulations were openly ignored. Various evils followed, including pestilences, which drove the leading citizens to the north of Italy and left the city to the mercy of the barbarians.

From very early days each city of Europe exercised some form of restrictions on buildings and the various European countries have developed numerous complex systems of control. In Austria the greatest liberty is permitted the architect, but he is held criminally responsible for the results of his work. In Germany and France the restrictions are numerous and detailed,

but engineering requirements as to stresses are very liberal compared with ours.

In London we find the most complete available example of building code evolution. In 1189 the first Lord Mayor, Henry Fitz-Aylwin, issued what was called the Assize of Building. It was a short document which empowered citizens to appear before the court of the Lord Mayor and Aldermen and demand protection from those encroaching on their rights. It provided for stone party walls at least 3 feet thick and at least 16 feet high on property lines, and provided for the procedure in building such walls in certain cases. The distances of cesspools from walls were established, rain-water gutters required, and it was stated that in case of a vioalation the work should be stopped until viewed by the Lord Mayor.

Apparently the Lord Mayor was to enforce the law and if he had done so all might have gone well, but it does not seem that he gave the matter much attention. Actual building inspection was left to the scavengers (or street cleaners). I will quote the oath in the original spelling;

SCAVENGER'S OATH

"Ye shal swear that ye shal wel and diligently observe that the Pavements in every ward be wel and rightfully repaired; and not haunted by the Noyance of the Neighbors; and that the ways, Streets, and Lanes be kept clene from Donge and other filth, for the Honesty of the City. And that all the chmnies

Reredoses, and Furnaces be made of stone, for defence of fire; and if ye know of any such ye shal show it to the Alderman; that he may make due Redress therefor. And this ye shal not leve. So help you God and by this Book."

In 1212 an ordinance forbade thatch on roofs and required tile roofing. During this period, and for many years after, London suffered severely from fires, but still the ordinances do not seem to have been observed. In 1302 the Aldermen ordered the thatch torn off a roof and for a time this ordinance appears to have been obeyed.

Little or no supervision was maintained as to signs, store show windows and similar obstructions, until the streets became so cluttered with these obstructions that they became almost impassable. Various ordinances were then passed establishing the maximum projection for store fronts and minimum height for signs.

One of the reasons for the numerous fires in London is evident from an ordinance in the time of Edward II (about 1330) requiring chimneys to be of stone, tile or plaster--timber chimney (probably plastered with clay) being forbidden.

Some time toward the end of the sixteenth century a body known as the Commissioners of Buildings was established, but these officers appear to have been more honorary than active. The oath of the scavengers appears almost the same at this time as it did earlier, and we find that the Commissioners of Buildings sought the aid of the constables in discovering

violations of the building laws, but we all know what the results were.

In Stow's Survey of London, published in 1633, we find the ordinances in force at that time. It is rather surprising that no mention is made of masonry party walls, although tiled roofs were required and shop fronts were not to be over 2½ feet thick, and "jetties" not less than 9 feet high.

There seems to have been little or no progress in building legislation during four centuries, and in some respects the tendency has been backward. London at this time was undergoing a great change. Hitherto, England had relied upon imports of luxury articles from Spain and Italy, most of which were obtained in Constantinople, Egypt, and Persia, but the excursions of Tartars and Turks into these countries and later into south-eastern Europe destroyed this commerce. America had been discovered not long before and further explorations led to the establishment of colonies and extensive foreign commerce. London grew rapidly from a provincial town to a great city. Great numbers of foreigners, especially Frenchmen, settled in London, as well as huge number people from the towns and rural districts of England. The housing conditions became very acute, particularly so because the lack of adequate transportation made it necessary for the workers to live close to their work. The situation had become so acute by 1580 that Queen Elizabeth issued a proclamation in the following words;

QUEEN'S PROCLAMATION OF 1580

"To the preservation of her People in Health, which may seem impossible to continue, though presently, by God's Goodness,

the same is perceived to be in better Estate universally than hath beene Man's Memorie: yet where there are such great Multitudes of People brought to inhabite in small rooms, wherof a great Part are seene very poore, yea, such as must live of begging, or by worse Means, and they heaped up together, and in a sort smothered with many families of Children and Servants in one House or small Tenement; it must needs followe, if any Plague or popular Sickness should, by God's Permission, enter amongst those Multitudes, that the same would not only spread i itself and invade the whole Citie and Confines but that a great Mortalitie would ensue the same, where her Majesties personal Presence is many times required.

For Remedie wherof, as Time may now serve, until by some further good Order be had in Parliament or otherwise, the same may be remedied; her Majestie, by good and deliberate advice of her Councell, and being also thereto moved by the considerate opinions of the Lord Mayor, Aldermen, and other the grave wise men in and about the Citie, doth charge and straightly command all manner of Persons, of what qualities soever they be, to desist and forbeare from any new Buildings of any House or Tenement within three miles from any of the Gates of the Sayde Citie of London, to serve for Habitation of Lodging for any Person, where no former House hath been knowen to have bene in the Memorie of such as are now living; and also to forbeare from letting or setting or suffering any more Families than one onely to be placed, or to inhabite from henceforth in any one House t

that heretofore hath bene inhabited."

This document is probably about as bad an example of building legislation as we can expect to find. The results were exactly the opposite intended. The erection of new buildings was to a condiderable degree checked, but the dividing of old buildings into small unsanitary tenements went merrily on.

For nearly a century the city authorities endeavored to enforce this law, being often prodded by royal authority, but all to no purpose. The conditions continued to grow worse, and in the fall of 1664 the plague came. For two years it continued unabated, practically paralyzing the business life of the city, and on September 2, 1666, a fire broke out which checked the plague but left London a smouldering ruin.

It was from the ruins of this fire that building legislation as we know it today arose. Parliament was promptly called in special session, and early in 1667 (Car.II-19-63) passed an act, entitled "An act for Rebuilding the City of London". This is quite an extensive document, providing a jail sentence for violation. It does not mention any type of building excepting dwellings, probably because all stores and work shops were within dwellings, and theaters, which were quite popular, were not permitted within the city limits. Dwellings were divided into four classes, depending upon the width of streets upon which they faced. Minimum ceiling height of from 8 to 9 feet were required and buildings were limited to 2 to 4 stories with cellar

and attic. Masonry walls were required for all exterior and party walls. Wall thicknesses were 8 inches for attic story, 12 inches for next two stories, and 16 inches or 20 inches below. Exterior balconies had to be of iron, rain-water leaders and gutters were required, and store-front posts were to be of oak. The act contains a vast amount of detail and closes with a list of required timber sizes for different spans and a number of provisions relative to construction of chimneys, spacing of joists, bearing of girders and similar matters. According to our present stresses, the minimum girder sizes would carry a 50-pound live load, but the minimum joist sizes would carry 167 pounds per square foot.

The act also provided for the widening of all streets less than 14 feet wide. Among the survivors of the fire was Sir Christopher Wren, then a young man, but probably the most brilliant builder England ever produced. He appeared before the civil authorities and urged that the city be rebuilt with wide streets, parks and open places. His advice was disregarded, and London was rebuilt upon the old lot lines, with narrow, winding streets and lanes. How unfortunate it was that his plan was not followed.

In the Act of 1667, surveyors were appointed to enforce the act, and these appear to be the first active officials who devoted their energies to this work in England.

In 1670 (Car. II-22-C-11) some amendments were made to this act, one of them requiring builders to take out a permit

from the city chamberlain at a cost of 6s. 8d., which included the laying out of the foundation by the surveyor.

In 1772 (Geo. III-12-C-73) further changes were made, bay windows were prohibited, a fine of 50 pounds sterling provided for improperly built chimneys, and property owners were empowered to tear down timber party walls, proving that the act had not to be obeyed in all cases. Also certain dangerous occupancies, such as the distillation of turpentine were regulated,but the requirements as to timber sizes were omitted and no provisions as to engineering details of interior construction appear in any England building act after this time.

In 1774 (Geo. III-14-C-78) the act was considerably modified and a very complex classification of building introduced, which I am unable to decipher. It was intended to govern factories and warehouses as well as dwellings, provide for wall thicknesses and other matters, and contained a large amount of detail on party walls.

In 1844 an important change was made in the system of building inspection. An act known as the Metropolitan Building Act (7&8 Victoria C-84) was passed which established a uniform code and system of inspection over the cities of London and Westminster and some 27 parishes, forming what we now call London, or more properly, the County of London.

The Commissioner of Works and Buildings was to be the final arthority assisted by a Board of Official References

and the district surveyors. The Board of Official References supervised the erection of public buildings and warehouses and acted as Board of Appeals. The penalty for failing to take out a permit was to pay three times the permit fee. Architects were required to call special inspections after completing framing of buildings. Extensive details of procedure regarding party walls were given as well as procedure in the case of dangerous buildings.

Numerous regulations as to dangerous and unsanitary trades and occupations were set down and the details of executing work, keeping records, and similar matters are covered. It was provided that the Official References were not to receive over 1,000 pounds sterling a year. An interesting detail is the provision that after 1864 no basement could be rented as a tenement separately from the upper stories of a building.

In 1855 the Metropolitan Management Act was passed, which considerably modified the building act of 1844 and extended the powers of the Metropolitan district to cover many phases of city engineering. A county or superintending architect was appointed to take full charge of building inspection, and all authority was centralized in his hands. The Official Board of References, which had become very unpopular, was dropped, and the requirements of the code somewhat simplified. Further amendments were made in 1860, '61, '62, '69, '71, '78, '82, '90, and '94. The complex classifications of 1844 were omitted, requirements simplified but made more definite, and provisions

as to housing, such as room sizes, courts, yards, ventilation introduced, until we find in the 1894 act a modern and workable code quite different from American codes, so far as engineering goes, since there are no stress requirements mentioned, but containing practically all of the housing provisions now found in our state housing codes, and being remarkably clear and practical in matters pertaining to construction of chimneys, walls, fire stops, and other essential details of construction. Since that time it has been supplemented by numerous local regulations.

The development of building codes in America is very complex because of the large number of legislative bodies who have contributed acts bearing on this subject. The great majority of these are municipal ordinances and the records are only available locally. I will confine myslf to mentioning two or three state acts given in the rather incomplete records available to me.

In the colony of New York in 1703 an act established the legal size of brick at 9"x ~~4⅜~~ 4¼"x2½" and provided a fine for failure to conform to these dimensions. In 1773, this was amended to forfeit illegal sized bricks to the Hospital of New York. Some time previous to 1775, an act was passed, entitled "An Act for the Regulation of Buildings and the Prevention of Fires". I have not been able to find this act, but it was probably a fire limits ordinance. In 1775, this act was amended because it had been frequently violated and a better

method of enforcement was necessary. The amended act permitted the construction of frame buildings in certain districts and also upon filled land, but required the owner of such land to notify the sheriff to assemble a jury of 12 freeholders to determine whether or not the land would sustain the weight of a masonry building. The oddest provision was a requirement that each alderman must present to the justice of the Supreme Court at the opening of each term of court a list of the buildings erected in their wards since the last term. These lists were to be submitted to the grand jury for investigation. The act expired in 1777, when the colony adopted a new charter, and for some years after no building laws were passed by the state authorities and none appeared in the compiled laws of 1807. No doubt there are some local acts, but the records are not available to me.

In early times the town of Boston suffered greatly from fires, and the building laws of early date seem to have been passed wholly with a view of preventing the spread of fire. The first act was in August of 1679, ordering that dwelling houses should be erected of stone or brick and covered with slate or tile, etc., and this seems to be the forerunner of the requirements for fireproof or fire-resisting building construction. Between that time and 1871 about two score of acts were passed, but as no one was designated to enforce these laws they seem to have availed but little.

In 1868, a tenement house act for Boston was passed, providing for ventilation and sanitary requirements, prohibiting the renting of basement dwellings, requiring 8-foot ceilings and windows one-tenth the area of the room. In 1870 (C-375) an act permitted cities other than Boston to establish fire limits.

An act of 1871 (C-280) established in Boston a department for the survey and inspection of buildings, and permitted the local council to establish fire limits (called building limits). The act required builders to obtain permits and present plans of public buildings. W all thicknesses were given, details of roof, chimney construction and related matters covered, and the tenement-house code of 1868 was somewhat modified and incorporated in this act. All previous acts were repealed. Procedure was provided in the case of dangerous buildings, but there are no references of floor loads or permissible stresses.

There were some slight amendments in 1872 (C-260) and in 1873 (C-298)-- a new provision required buildings over 80 feet high to be fireproof. T he effort to describe fireproof construction indicates a distinct lack of comprehension of essential principles. No fireproofing is required on steel or other metals. A n amendment of 1877 (C-214) relates to the stair requirements and inspection of factories and two amendments in 1882 (C-208 and C-252) require safety devices on elevators and empowered Boston to authorize the construction of elevators,

license plumbers, and establish the thickness of walls not of brick or stone.

In 1888 (C-426) an amendment relative to public buildings provides for exits, requires fire resistive theater curtains, fire extinguishers, and numerous similar details. In 1891 buildings were limited to 125 feet in height.

In 1892 (C-419) an entirely new code was adopted, which for the first time in this state, contained stress requirements. Permissable stresses on wood, steel, cast iron and masonry are given, there being a complete loading table for timber and cast-iron columns. For the completeness of engineering requirements in this code, it would appear that in some other city probably New York, a similar code had been adopted previously but I have no exact information on this point. In 1907 (C-550) another new code was adopted, which, with numerous amendments in now in force.

Since about 1900 the number of building codes in America has become so great and the changes so numerous that it is meaningless to attempt to trace any one code. The general tendency has been to make codes more complete, more detailed, to embrace an ever-widening circle of new building materials and gradually to decrease floor-load requirements and increase stresses on materials. The divergence of opinions on the various details has been very great, however, and in 1921 the United States Department of Commerce, under Secretary Hoover,

undertook to lead the way toward suggesting a standard of requirements for some of the more important points by issuing various pamphlets on certain phases of building code work.

A committee headed by the late Prof. Ira Woolson acted as advisors in this work and issued first a model plumbing ordinance, then a model small dwelling-house code. Later, pamphlets on the suggested arrangement of building codes, on stresses of building materials and on masonry requirements were issued. At the present time the committee is preparing to issue a suggested ordinance on fire resistance of structures.